

Some force sensors, for example those manufactured by C-Cubed Limited, are read out via a Wheatstone bridge. Thus, as shown in FIG. 14, one or more of the four resistors 1401–1404 may correspond to piezoresistive elements in the force sensor. In the embodiment shown, the bridge is connected to ground via a capacitor 1405. Although capacitor 1405 is not required, it may be useful for reducing the differences between the excitation and feedback voltages, thereby making the ratio of ΔV to V_0 more similar to signals from the projective-capacitive electrodes.

As will be understood by those familiar with the art, the present invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. Accordingly, the disclosures and descriptions herein are intended to be illustrative, but not limiting, of the scope of the invention which is set forth in the following claims.

What is claimed is:

1. A touchscreen system, comprising:

at least one force sensor coupled to a touchscreen of said touchscreen system, said force sensor monitoring a force component associated with a touch of said touchscreen;

a projective-capacitive sensor system coupled to said touchscreen; and

a processor coupled to said at least one force sensor and said projective-capacitive sensor system, wherein said processor calculates a set of position coordinates associated with said touch when said force component is greater than a force threshold, said set of position coordinates determined by said projective-capacitive sensor system.

2. The touchscreen system of claim 1, wherein said processor sets said force threshold.

3. The touchscreen system of claim 1, wherein said processor increases said force threshold when said projective-capacitive sensor system does not register said touch substantially simultaneously with said at least one force sensor.

4. The touchscreen system of claim 1, further comprising a discriminator coupled to said at least one force sensor, wherein said discriminator determines if said force component exceeds said force threshold.

5. A touchscreen system, comprising:

a plurality of force sensors coupled to a touchscreen of said touchscreen system;

at least one electrode coupled to said touchscreen;

a projective-capacitive sensor system coupled to said at least one electrode, wherein said at least one electrode is insufficient to determine a set of position coordinates associated with a touch of said touchscreen; and

a processor coupled to said plurality of force sensors and said projective-capacitive sensor system, wherein said processor calculates said set of position coordinates when said plurality of force sensors and said projective-capacitive sensor system substantially simultaneously detect said touch, wherein said set of position coordinates is determined by said plurality of force sensors.

6. The touchscreen system of claim 5, wherein said at least one electrode is formed along a single axis of said touchscreen.

7. A touchscreen system, comprising:

a plurality of force sensors coupled to a touchscreen of said touchscreen system;

a plurality of electrodes coupled to said touchscreen, wherein a first portion of said plurality of electrodes are

formed along a first axis and a second portion of said plurality of electrodes are formed along a second axis; a projective-capacitive sensor system coupled to said plurality of electrodes; and

a processor coupled to said plurality of force sensors and said projective-capacitive sensor system, wherein said processor calculates said set of position coordinates when said plurality of force sensors and said projective-capacitive sensor system substantially simultaneously detect a touch of said touchscreen.

8. The touchscreen system of claim 7, wherein said first axis is substantially orthogonal to said second axis.

9. The touchscreen system of claim 7, wherein said set of position coordinates is registered by said plurality of force sensors.

10. The touchscreen system of claim 7, wherein said set of position coordinates is registered by said projective-capacitive sensor system.

11. A method of operating a touchscreen system, comprising the steps of:

detecting a force applied to a touchscreen of said touchscreen system with at least one force sensor, wherein said detected force corresponds to a touch of said touchscreen;

confirming said touch of said touchscreen detected by said at least one force sensor with a projective-capacitive sensor;

generating a set of position coordinates corresponding to said touch; and

transmitting said set of position coordinates to a touchscreen operating system.

12. The method of claim 11, further comprising the step of returning said touchscreen system to a stand-by mode if a negative response to said confirming step is received from said projective-capacitive sensor.

13. The method of claim 11, further comprising the step of setting an untouch threshold for said projective-capacitive sensor.

14. The method of claim 13, wherein said untouch threshold is a percentage of an initial projective-capacitive signal amplitude determined when said touch was first detected by said force sensor.

15. The method of claim 13, further comprising the step of comparing a projective-capacitive signal amplitude corresponding to said touch to said untouch threshold, wherein said set of position coordinates corresponds to a second touch location associated with said projective-capacitive signal amplitude falling below said untouch threshold.

16. The method of claim 13, further comprising the steps of comparing a projective-capacitive signal amplitude corresponding to said touch to said untouch threshold, and generating a second set of position coordinates corresponding to a second touch location associated with said projective-capacitive signal amplitude falling below said untouch threshold.

17. The method of claim 15, further comprising the steps of generating an untouch message when said projective-capacitive signal amplitude falls below said untouch threshold and transmitting said untouch message to said touchscreen operating system.

18. The method of claim 11, wherein said set of position coordinates is generated by said at least one force sensor.

19. The method of claim 11, wherein said set of position coordinates is generated by said projective-capacitive sensor.

20. The method of claim 11, further comprising the step of setting a force sensor threshold if a negative response to